

**ABSTRACT OF THE DISCLOSURE**

- A novel quantum well intermixing method for regionally modifying the bandgap properties of InGaAsP quantum well structures is disclosed. The
- 5 method induces bandgap wavelength blue shifting and deep states for reducing carrier lifetime within InGaAsP quantum well structures. The novel quantum well intermixing technique is applied to the modulator section of an integrated DFB laser/electro-absorption modulator, wherein the modulator exhibits fast switching times with efficient optical coupling
- 10 between the DFB laser and modulator region.

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